WHAT IS CLAIMED IS:

1. A method for the detection of points of interest in a source digital image, said method implementing a wavelet transformation associating a sub-sampled image, called a scale image, with a source image, and wavelet coefficients corresponding to at least one detail image, for at least one level of decomposition,

a point of interest being a point associated with a region of the image showing high frequencies.

wherein the method comprises the following steps:

- the application of said wavelet transformations to said source image;
- the construction of a unique tree structure from the wavelet coefficients of each of said detail images;
- the selection of at least one point of interest by analysis of said tree structure.

2. A method according to claim 1, wherein for each level of decomposition, at least two detail images, respectively corresponding to at least two directions predetermined by said wavelet transformation, are determined.

3. A method according to claim 2, wherein the detail images comprise:

- a detail image representing the vertical high frequencies;
- a detail image representing the horizontal high frequencies;
- a detail image representing the diagonal high frequencies.

4. A method according to any of the claims 2 and 3, comprising a step for merging the coefficients of said detail images so as not to give preference to any direction of said source image.

5. A method according to any of the claims 1 to 4, wherein said step for the construction of a tree structure relies on a zerotree type of approach.

6. A method according to any of the claims 1 to 5, wherein each point of the scale image having minimum resolution is the root of a tree on which an offspring node is associated with each of the wavelet coefficients of each of said detail

image or images localized at the same position,

and then recursively, four offspring nodes are associated with each offspring node of a given level of resolution, these four associated offspring nodes being formed by the wavelet coefficients of the detail image that is of a same type and at the previous resolution level and that is associated with the corresponding region of the source image.

7. A method according to any of the claims 1 to 6, wherein said selection step implements a step for the construction of at least one salience map, assigning said wavelet coefficients a salience value representing their interest.

8. A method according to claim 7, wherein a salience map is built for each of said resolution levels.

9. A method according to any of the claims 7 and 8 wherein, for each of said salience maps, for each salience value, a merging is performed of the pieces of information associated with the three wavelet coefficients corresponding to the three detail images as not to give preference to any direction in the image.

10. A method according to any of the claims 7 to 9, wherein a salience value of a given wavelet coefficient having a given level of resolution takes account of the salience value or values of the descending-order wavelet coefficients in said tree structure of said given wavelet coefficient.

11. A method according to any of the claims 7 to 10, wherein a salience value is a linear relationship of the associated wavelet coefficients.

12. A method according to claim 11, wherein the salience value of a given wavelet coefficient is computed from the following equations:

$$\begin{cases} S_{2^{-1}}(x,y) = \alpha_{-1}\left(\dfrac{1}{3}\displaystyle\sum_{u=1}^{3}\dfrac{D^{u}_{2^{-1}}(x,y)}{Max(D^{u}_{2^{-1}})}\right) \\ S_{2^{j}}(x,y) = \dfrac{1}{2}\left(\alpha_{j}\left(\dfrac{1}{3}\displaystyle\sum_{u=1}^{3}\dfrac{D^{u}_{2^{j}}(x,y)}{Max(D^{u}_{2^{j}})}\right) + \dfrac{1}{4}\displaystyle\sum_{u=0}^{1}\sum_{v=0}^{1} S_{2^{j+1}}(2x+u,2y+v)\right) \end{cases}$$

13. A method according to claim 12, wherein the parameter α_k is equal to $-1/r$ for all the values of k.

14. A method according to any of the claims 7 to 13, wherein said selection step comprises a step for building a tree structure of said salience values.

15. A method according to claim 14, wherein said step for the construction of a tree structure relies on a zerotree type of approach.

16. A method according to any of the claims 14 and 15, wherein said selection step advantageously comprises the steps of:

- descending-order sorting of the salience values of the salience map corresponding to the minimum resolution;
- selection of the branch having the highest salience value for each of the trees thus sorted out.

17. A method according to claim 16, wherein said step for the selection of the branch having the highest salience value implements a corresponding scan of the tree starting from its root and a selection, at each level of the tree, of the offspring node having the highest salience value.

18. A method according to any of the claims 1 to 17, wherein said wavelet transformation implements the Haar base.

19. A method according to any of the claims 1 to 18, wherein a minimum level of resolution 2^{-4}.

20. A method according to any of the claims 1 to 15, comprising a step for the computation of an image signature from a predetermined number of points of interest of said image.

21. A method according to claim 20, wherein said signature is used especially to index images by their content.

22. Application of the method for detecting points of interest in a source digital image according to any of the claims 1 to 21 to at least one of the fields comprising:

- image watermarking;
- image indexing;
- the detection of faces in an image.

23. A device for the detection of points of interest in a source digital image, implementing a wavelet transformation associating a sub-sampled image, called a scale image, with a source image, and wavelet coefficients corresponding to at least one detail image, for at least one level of decomposition,

a point of interest being a point associated with a region of the image showing high frequencies.

wherein the device comprises:

- means for the application of said wavelet transformations to said source image;
- means for the construction of a unique tree structure from the wavelet coefficients of each of said detail images;
- means for the selection of at least one point of interest by analysis of said tree structure.

24. Computer program products comprising program code instructions for the execution of the steps of the method for the detection of points of interest in a source digital image according to any of the claims 1 to 22.

25. Computer program product comprising program code instructions recorded on a carrier usable in a computer, comprising computer-readable programming means for the implementation of a wavelet transformation associating a sub-sampled image, called a scale image, with a source image, and wavelet coefficients corresponding to at least one detail image, for at least one level of decomposition,

a point of interest being a point associated with a region of the image showing high frequencies,

wherein the computer program product comprises:

- computer-readable programming means to carry out the application of said wavelet transformations to said source image;
- computer-readable programming means to carry out the construction of a unique tree structure from the wavelet coefficients of each of said detail images;

- computer-readable programming means to carry out the selection of at least one point of interest by analysis of said tree structure.

26. Computer-usable digital data carrier comprising program code instructions of a computer program according to either of the claims 24 and 25.